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DEDUCING FLOOR PLANS USING MODULAR WALL UNITS

TECHNICAL FIELD

[0001] The present disclosure relates generally to electrical systems and in particular to a modular and configurable utility system for a building.

BACKGROUND

[0002] Smart home technology has greatly improved in power and functionality in recent years and can provide an enhanced user experience that can be tailored to meet an individual user's particular needs. For instance, smart lights, smart security systems, smart entertainment systems, environmental control systems (HVAC), and the like, are becoming more and more customizable and integrated as the internet-of-things (IoT) sets a foothold in modern home designs.

[0003] Configuring the smart home can present many challenges. For instance, the differentiation of brands and their incompatibilities between each other, differing connection and communication protocols, wiring and connector types, hardware/software configurations, and general system set up can be daunting to the average consumer. Even technology savvy enthusiasts may be challenged by the non-intuitive and often frustratingly laborious process of configuring a fully integrated smart home. Furthermore, smart home networks often need to be reconfigured, sometimes extensively, as old equipment is replaced with new equipment. Despite the many advantages that smart home technology brings to society, there is a need for smart home systems that can allow lay-consumers to more easily customize, scale, and reconfigure their homes in a more effortless and user friendly manner.

SUMMARY

[0004] In certain embodiments, a method may include receiving floor plan data corresponding to at least one of a location, dimensions, or orientation of one or more walls defining at least one room of a building; receiving sensor data corresponding to detected activity within the at least one room of the building; determining a type of the at least one room of the building based on the detected activity; and modifying the floor plan data to include the determined type of the at least one of the one or more rooms, wherein a visual representation of the floor plan data is operable to be output on a display device. The method may further include determining an area of the at least one room of the building, where determining the type of the at least one room is further based on the area of the at least one room. In some aspects, the floor plan data can include a plurality of rooms, and wherein determining the type of the at least one room is further based on the location of the one room relative to locations of the remaining plurality of rooms.

[0005] In some embodiments, the sensor data can include image data, and the method can further comprise: tracking a movement of an object in the one or more rooms, wherein determining the type of the at least one of the one or more rooms is further based on at least one of: an amount of time the object has spent in the one or more rooms, the amount of time based on the tracked movement of the object; and a traffic pattern of the object in the one or more rooms, the traffic pattern of the object based on the tracked movement of the object. In some cases, the sensor data may include audio data, and the method can further comprise: tracking a movement of an object in the one or more rooms, where determining the type of the at least one of the one or more rooms is further based on at least one of: an amount of time the object has spent in the one or more rooms, the amount of time based on the tracked movement of the object; and a traffic pattern of the object in the one or more rooms, the traffic pattern of the object based on the tracked movement of the object.

[0006] In certain embodiments, the sensor data may include electromagnetic interference (EMI) data, and the method can further comprise: determining a type of the object based on the EMI data; tracking a movement of an object in the one or more rooms, wherein determining the type of the at least one of the one or more rooms is further based on at least one of: an amount of time the object has spent in the one or more rooms, the amount of time based on the tracked movement of the object; and a traffic pattern of the object in the one or more rooms, the traffic pattern of the object based on the tracked movement of the object. In some cases, determining a type of the object based on the EMI data includes determining a unique digital identifier (unique ID) of the object. In some aspects, the digital floor plan data can include a location of a powered appliance within the at least one room of the building, where the sensor data includes power data from the powered appliance, and where determining the type of the at least one room of the building is further based on the power data of the powered appliance. The power data may include (but is not limited to) at least one of: a power usage profile; a power frequency profile; a power factor; and inductive or reactive loads. In some aspects, the digital floor plan data may include a location of a host unit disposed within one of the one or more walls, where the sensor data includes accelerometer data from the host unit, the accelerometer data including data corresponding to vibrations within the wall that the host unit is disposed in, and where the determining the type of the at least one room of the building is further based on characteristics and a location of the detected vibrations.

[0007] Certain embodiments may include a non-transitory computer-program product tangibly embodied in a machine-readable non-transitory storage medium that includes instructions configured to cause one or more processors to perform operations including: receiving floor plan data corresponding to at least one of a location, dimensions, or orientation of one or more walls defining at least one room of a building; receiving sensor data corresponding to detected activity within the at least one room of the building; determining a type of the at least one room of the building based on the detected activity; and modifying the floor plan data to include the determined type of the at least one of the one or more rooms, wherein a visual representation of the floor plan data is operable to be output on a display device. The instructions may be further configured to cause the one or more processors to perform operations including: determining an area of the at least one room of the building, where determining the type of the at least one room is further based on the area of the at least one room. The floor plan data can include a plurality of rooms, and determining the type of the at least one room can be further based on the location of the one room relative to locations of the remaining plurality of rooms.